-- REMARKS --

The present amendment replies to a Final Office Action dated July 21, 2006. Claims 1-20 are currently pending in the present application. Claims 13-20 have been withdrawn. In the Final Office Action, the Examiner rejected claims 1-12 on various grounds. The Applicant responds to each ground of rejection as subsequently recited herein and requests reconsideration of the present application.

35 U.S.C. §103 Rejections

To establish a *prima facie* case of obviousness, three basic criteria must be met. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. Second, there must be a reasonable expectation of success. Finally, the prior art references when combined must teach or suggest all the claim limitations. *See* MPEP 2143. To establish *prima facie* obviousness of a claimed invention, all the claim limitations must be taught or suggested by the prior art. *In re Royka*, 490 F.2d 981, 180 USPQ 580 (CCPA 1974). *See* MPEP 2143.03. The Applicant respectfully asserts that the cited references fail to teach or suggest all the claim limitations.

A. Claims 1-3, 6-8, and 12 were rejected under 35 U.S.C. §103(a) as being unpatentable over U.S. Patent No. 6,603,909 to Varner (the *Varner* patent) in view of Becker, *et al.* (the *Becker* publication) [Erbium Doped Fiber Amplifiers and Technology, 1999].

The Applicant respectfully asserts that the *Varner* patent and the *Becker* publication, alone or in combination, fail to teach or suggest all the claim limitations of the rejected claims. The *Varner* patent fails to disclose, teach, or suggest an optical switch including a loss element having a signal loss, and a rare earth doped gain element operable to produce a signal gain, in which the signal gain and the signal loss are about equal, as recited in independent claim 1. The *Becker* publication also fails to disclose, teach, or suggest these limitations.

At most, the *Varner* patent discloses a laser pigtail fiber with inherent attenuation characteristic as part of a fiber optic telecommunication system with a pump laser and an optical amplifier. An optical fiber is provided to connect the devices which has an ultraviolet photosensitive core, a low attenuation single mode wavelength region and a very high attenuation, longer wavelength region. *See* Abstract. An input fiber 950 carries an optical signal from a signal source 910 to the amplifier 930. *See* Fig. 9c; column 8, line 66 through column 9, line 66.

There is no suggestion in the *Varner* patent that the fiber optic telecommunication system act as an optical switch, that any portion of the input fiber 950 act as a loss element having a signal loss, or that the signal gain and the signal loss are about equal so that the fiber optic telecommunication system can act as a switch. A switch as defined by *The Columbia Electronic Encyclopedia, Sixth Edition,* Copyright © 2003, Columbia University Press, as an electrical device having two states: on, or closed; and off, or open. There is no suggestion in the *Varner* patent that the fiber optic telecommunication system has a useful on and off configuration, so the *Varner* patent fails to suggest an optical switch as recited in independent claim 1.

The *Varner* patent also fails to suggest that any portion of the input fiber 950 act as a loss element having a signal loss. The *Varner* patent only discloses that the optical communication system may also include signal source 990 outputting a signal through optical fiber 950 to optical coupler 960, and that the input fiber 950 carries an optical signal from a signal source 910 to the amplifier 930. *See* Fig. 9c; column 8, lines 38-40; column 8, line 66 through column 9, line 66. The *Varner* patent is silent as to the optical fiber 950 having any signal loss. When the optical fiber 950 between the elements 990 and 960 is short, or the optical fiber 950 is of high quality, the signal loss between the elements 990 and 960 will be negligible. Therefore, the *Varner* patent fails to suggest a loss element having a signal loss switch as recited in independent claim 1.

The *Varner* patent with the *Becker* publication also fails to suggest the signal gain and the signal loss being about equal. The Examiner concluded that it would have been obvious to adjust the pump power of the light source 910 so that the signal gain equals the signal loss to compensate for signal attenuation and ensure reception at the receiver. The Applicants respectfully disagree. Any number of pump powers are available to ensure reception at the receiver without the signal gain equaling the signal loss, so setting the gain equal to the loss is not an obvious choice. For example, one skilled in the art is likely to select the largest signal gain for the amplifier 930 consistent with noise limitations to ensure reception at the receiver. The signal gain can be greater than or less than the signal loss in the *Varner* patent, so the *Varner* patent fails to suggest the signal gain and the signal loss being about equal as recited in independent claim 1. Setting the signal gain about equal to the signal loss is not a latent property of the invention of the *Varner* patent and so does not flow naturally from the *Varner* patent. *See* MPEP 2145, Section II.

Claims 2, 3, 6-8, and 12 depend directly or indirectly from independent claim 1 and so include all the elements and limitations of independent claim 1. As discussed above, the *Varner* patent and the *Becker* publication, alone or in combination, fail to teach or suggest an optical switch including a loss element having a signal loss, and a rare earth doped gain element operable to produce a signal gain, in which the signal gain and the signal loss are about equal. Because claims 2, 3, 6-8, and 12 depend from and incorporate the elements of independent claim 1, claims 2, 3, 6-8, and 12 are allowable over the *Varner* patent and the *Becker* publication, alone or in combination.

Withdrawal of the rejection of claims 1-3, 6-8, and 12 under 35 U.S.C. §103(a) as being unpatentable over the *Varner* patent in view of the *Becker* publication is respectfully requested.

B. Claims 2-3, 7-8, and 12 were rejected under 35 U.S.C. §103(a) as being unpatentable over U.S. Patent No. 6,603,909 to Varner (the *Varner* patent) in view of Becker, *et al.* (the *Becker* publication) [Erbium Doped Fiber Amplifiers and Technology, 1999], and further in view of U.S. Patent No. 5,475,528 to LaBorde (the *LaBorde* patent).

The Applicant respectfully asserts that the *Varner* patent, the *Becker* publication, and the *LaBorde* patent, alone or in combination, fail to teach or suggest all the claim limitations of the rejected claims.

Claims 2-3, 7-8, and 12 depend directly or indirectly from independent claim 1 and so include all the elements and limitations of independent claim 1. As discussed in Section A above, the *Varner* patent and the *Becker* publication, alone or in combination, fail to teach or suggest an optical switch including a loss element having a signal loss, and a rare earth doped gain element operable to produce a signal gain, in which the signal gain and the signal loss are about equal. The *LaBorde* patent also fails to disclose, teach, or suggest these elements. Because claims 2-3, 7-8, and 12 depend from and incorporates the elements of independent claim 1, claims 2-3, 7-8, and 12 are allowable over the *Varner* patent, the *Becker* publication, and the *LaBorde* patent, alone or in combination.

Regarding claims 2 and 7, the Abstract of the *LaBorde* patent cited by the Examiner discloses glass doped with up to 5 weight % erbium oxide, not the core being doped with at least one species of rare earth ion in the range of 5 to 75 wt% as recited in claim 2 and 7. The Applicants respectfully disagree with the Examiner's conclusion that glass doped with up to 5 weight % erbium oxide in the *LaBorde* patent is in the claimed range 5 to 75 wt%. The *LaBorde* patent teaches away from the claimed range by stating that it is apparent that lifetimes above 8 milliseconds can be obtained with an erbium loading of up to about 3 %. It has been found that glasses doped with amounts of erbium greater than about 3 weight % tend to quench, that is undergo a condition which greatly reduces the excited-state lifetime. *See* column 5, lines 35-42. The excited state lifetime falls off rapidly, with the excited state lifetime at 5 weight % being half the excited state lifetime at 3 weight %. *See* Fig. 1.

Withdrawal of the rejection of claims 2-3, 7-8, and 12 under 35 U.S.C. §103(a) as being unpatentable over the *Varner* patent in view of the *Becker* publication and further in view of the *LaBorde* patent is respectfully requested.

C. Claims 4 and 9-10 were rejected under 35 U.S.C. §103(a) as being unpatentable over U.S. Patent No. 6,603,909 to Varner (the *Varner* patent) in view of Becker, *et al.* (the *Becker* publication) [Erbium Doped Fiber Amplifiers and Technology, 1999], and further in view of U.S. Patent No. 6,430,349 to Hayden (the *Hayden* patent).

The Applicant respectfully asserts that the *Varner* patent, the *Becker* publication, and the *Hayden* patent, alone or in combination, fail to teach or suggest all the claim limitations of the rejected claims.

Claims 4 and 9-10 depend directly or indirectly from independent claim 1 and so include all the elements and limitations of independent claim 1. As discussed in Section A above, the *Varner* patent and the *Becker* publication, alone or in combination, fail to teach or suggest an optical switch including a loss element having a signal loss, and a rare earth doped gain element operable to produce a signal gain, in which the signal gain and the signal loss are about equal. The *Hayden* patent also fails to disclose, teach, or suggest these elements. Because claims 4 and 9-10 depend from and incorporates the elements of independent claim 1, claim claims 4 and 9-10 are allowable over the *Varner* patent, the *Becker* publication, and the *Hayden* patent, alone or in combination.

Withdrawal of the rejection of claims 4 and 9-10 under 35 U.S.C. §103(a) as being unpatentable over the *Varner* patent in view of the *Becker* publication and further in view of the *Hayden* patent is respectfully requested.

D. Claims 5 and 11 were rejected under 35 U.S.C. §103(a) as being unpatentable over U.S. Patent No. 6,603,909 to Varner (the *Varner* patent) in view of Becker, *et al.* (the *Becker* publication) [Erbium Doped Fiber Amplifiers and Technology, 1999], and further in view of U.S. Patent Publication No. 2002/0030881 to Nilsson (the *Nilsson* application).

The Applicant respectfully asserts that the *Varner* patent, the *Becker* publication, and the *Nilsson* application, alone or in combination, fail to teach or suggest all the claim limitations of the rejected claims.

Claims 5 and 11 depend directly or indirectly from independent claim 1 and so include all the elements and limitations of independent claim 1. As discussed in Section A above, the *Varner* patent and the *Becker* publication, alone or in combination, fail to teach or suggest an optical switch including a loss element having a signal loss, and a rare earth doped gain element operable to produce a signal gain, in which the signal gain and the signal loss are about equal. The *Nilsson* application also fails to disclose, teach, or suggest these elements. Because claims 5 and 11 depend from and incorporates the elements of independent claim 1, claim claims 5 and 11 are allowable over the *Varner* patent, the *Becker* publication, and the *Nilsson* application, alone or in combination.

Withdrawal of the rejection of claims 5 and 11 under 35 U.S.C. §103(a) as being unpatentable over the *Varner* patent in view of the *Becker* publication and further in view of the *Nilsson* application is respectfully requested.

SUMMARY

Reconsideration of the rejection of claims 1-12 is requested in light of the remarks herein. The Applicant submits that claims 1-12 as set forth fully satisfy the requirements of 35 U.S.C. §§102, 103, and 112. In view of foregoing remarks, favorable consideration and early passage to issue of the present application are respectfully requested.

Dated: **September 21, 2006**

Respectfully submitted,

/FRANK C. NICHOLAS/

FRANK C. NICHOLAS
Registration No. (33,983)
Attorney for Applicants

CARDINAL LAW GROUP
1603 Orrington Avenue, Suite 2000
Evanston, IL 60201
(847) 905-7111